(2)

AN

ACCOUNT

OF THE

CULTURE AND USE

OF THE

MANGEL WURZEL,

OR

ROOT OF SCARCITY.

TRANSLATED FROM THE FRENCH

OF

THE ABBÉ DE COMMERELL,

CORRESPONDING MEMBER OF THE ROYAL SOCIETY
OF ARTS AND SCIENCES AT METZ.

THE THIRD EDITION.

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BRITISH MUSEUM
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ADVERTISEMENT.

IN the midſummer of 1786, a few ſeeds were given me, ſaid to be thoſe of a dietetic vegetable, known in France under the name of the *Racine de Diſette*[*]. As I was then ignorant of its cultivation and qualities, I planted the ſeeds in light earth, which was then placed in my hot-houſe. They vegetated in about a week, and in the ſpace of two months had acquired ſtalks of the thickneſs of a gooſe-quill, when they were tranſplanted into the open air.

Although this was in September, they continued to increaſe rapidly, and preſerved their verdure throughout the winter. In this ſeaſon I plucked off ſome of the leaves, and had them boiled for the table; they were of a fine green colour, lighter than ſpinach, and ſomething like it in taſte, with a flavour ſomewhat reſembling that of aſparagus.

At this period, I took up three roots, each about four ounces in weight, which, after boiling, eat very much like parſnips, and the roots had the ſame ſhape.

So much I had experienced of the cultivation and uſe of this vegetable, when the following account of it fell into my hands; a tranſlation of which I immediately procured, and now publiſh, in order to diffuſe the knowledge of ſo beneficial an article of diet.

Though this country does not ſpontaneouſly produce any great variety of vegetables proper for the table; yet by the introduction of foreign products, and the arts of culture, it nouriſhes in its boſom, at this time, the

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[*] The late Sir Richard Jebb, was, I believe, the firſt perſon in England in poſſeſſion of theſe ſeeds; ſome of which were preſented to the Society of Arts, and by the Secretary to ſome of the members among whom I was included.

greateſt and moſt uſeful varieties of fruits, and other dietetic vegetables, in the world. I conceive, however, that every additional article of nouriſhment, eſpecially like this almoſt incredibly abundant, and at the ſame time ſalutary both to the human and brute ſpecies, muſt, like the Potatoe which Raleigh brought from America, prove an intereſting acquiſition to the public. I calculate, from the product of my garden, that a ſquare yard of ground, planted with the Mangel Wurzel, will yield FIFTY POUNDS in weight of ſalutary food; an abundance equalled by few, if any other plants hitherto cultivated in Europe.

The laſt winter was unuſually mild; during the whole of which, this vegetable retained its verdure, as has been already obſerved: and as it has never experienced any other winter here, I cannot determine what effect a ſevere ſeaſon might produce. I remarked, that the new ſhoots augmented by plucking the leaves of a preceding growth; and that even the ſtalks that ſhot into flower in June 1787, and were accidentally broken off, were replaced by freſh ſtalks and flowers in the ſucceeding month; leſs ſtrong, indeed, but more numerous.

As I have lately procured ſome ſeeds from the continent, I ſhall pay further attention to the cultivation of this vegetable; and hope to add its botanical hiſtory, and an accurate engraving of it, coloured from nature.

JOHN COAKLEY LETTSOM.

London, Aug. 1, 1787.

THE

BRITISH MUSEUM

THE
PREFACE
TO THE
SECOND EDITION.

THE demand for the firſt edition of the following performance has been ſo great, as to call almoſt immediately for a ſecond; which has prevented me from accompliſhing, as I had propoſed, a coloured plate of the Mangel Wurzel, with a botanical deſcription of the plant. An engraving of it is now under the artiſt's hand, but it cannot be completed early enough to accompany the preſent impreſſion.

As the attention of the public to the culture of this plant appears to have been much excited, I was unwilling by deferring the republication of this account, to diſappoint the laudable curioſity of the lovers of horti-culture. The delay of the propoſed deſcription will not be productive of much inconvenience as the plants which have been raiſed from ſeed ſince Midſummer, of which about three thouſand have been diſpoſed of, cannot go into flower before next year, and prior to that period, I ſhall not only have completed the botanical account of the Mangel Wurzel, but ſhall have perhaps acquired alſo additional experience in the culture of it, and of ſome other culinary vegetables, whoſe hiſtory, I hope, will accompany it.

The plants thus diſperſed will, however, be attended with the advantages of affording leaves for the uſe of the table during the autumn and winter, and will afterwards run into ſeed in the enſuing ſummer. The quantity of ſeed produced from one root will nearly ſuffice to cover half an acre of ground with the Mangel Wurzel: ſo that in a very few years it will be common throughout Europe, America, and the Weſt-Indies, if the ſeeds and plants proſper, which I have diſtributed and ſent abroad.*

Since the firſt edition of this tranſlation was printed, I have ſeen the Mangel Wurzel in flower, and am convinced that it is a ſpecies of beet, of which there are ſeveral cultivated in this country, particularly the white, green, red, yellow, and great white Swiſs beet,† the laſt of which it nearly reſembles.

This affinity, however, does not detract from the value of the Mangel Wurzel, every part of which is edible and ſalutary; and beſides allowing nutritious fodder for cattle, affords a ſupply for the table, both in ſummer and winter, as has been obſerved. The leaves exceed ſpinach, and the roots thoſe of parſnips. The ſtalks and ribs of the large leaves, diveſted of the leafy part, and peeled, eat like aſparagus; or may be uſed in ſoups, which they greatly improve. The leaves tied up in a bag or net, with ſlices of meat interlaid, and boiled, make a diſh both pleaſant and ſalutary; or with plumbs, damſons, ſliced apples, quinces, &c. afford a diet that is highly eſteemed by many.

I plead excuſe of the reader for theſe culinary digreſſions, but theſe minutiæ are neceſſary in the deſcription of a plant which promiſes to furniſh an agreeable variety to the tables of the opulent, and, which is of infinitely more importance, to provide the poor with food both cheap and wholſome.

Theſe conſiderations, and a perſuaſion of the abundant produce of the Root of Scarcity, induced me to encourage its cultivation, by diſpoſing of the plants to perſons in the poſſeſſion of gardens. At firſt I was able to part with ſeveral of them to each individual who applied; but at length I am reduced to the neceſſity of appearing a niggard, as the numerous demands have nearly cleared my garden of them; but I have ſent to Paris for a large ſupply of ſeeds, which I ſhall divide, as ſoon as they arrive, with thoſe of my own, now nearly fit to gather, into ſmall parcels, for the purpoſe of giving away to ſuch perſons as have already had ſome plants, and to as many more as pleaſe to apply, till the ſeedſmen in London procure them for ſale. There may be individuals averſe to accept them gratuitouſly, or who, from a fear of giving trouble, may be deterred from making application; but as they cannot yet be purchaſed here, theſe objections ſhould not be admitted in oppoſition to deſigns of public utility. Indeed by ſuch applications they rather confer an obligation on the donor: for I am perſuaded that the culture of this plant will prove a national benefit; in contributing to which I feel a ſincere pleaſure, and have therefore a ſelfiſh wiſh to extend on every hand, the cultivation of the Root of Scarcity.

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* It may be obſerved that many of theſe plants, having been injured in their tap-roots, by tranſplanting, will not afford a fair ſpecimen of the immenſe growth which the roots of this vegetable acquire.

† The Cicla of Miller; and Chard, or Swiſs Beet of Abercrombie.

How many families ſurround the metropolis, in poſſeſſion of little gardens, often abounding in weeds; who, with leſs trouble than is neceſſary to clear them away, might dine once a week* upon this ſalutary vegetable!

How many are there, with a little tract of land, ſcarcely ſufficient to feed the cow, which is to ſupply the family with milk, might compenſate the deficiency of a dry ſummer, by covering a part of the land with the Root of Scarcity!

How many perſons in affluence, by devoting a ſpace of ground to raiſe this prolific vegetable, might ſupply their poor neighbours, in hard winters, with its roots and leaves, which ſeaſoned with a morſel of meat, would afford a pleaſant and plentiful nouriſhment.

All theſe, as long as I poſſeſs ſeeds, may be immediately ſupplied, upon application, with a portion of them.

JOHN COAKLEY LETTSOM.

London, Sept. 5, 1787.

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* Thirty ſeeds produce upon an average about one hundred plants, which may afford a ſalutary vegetable for the table of a ſmall family, three days in the week during the whole year.

INTRO-

INTRODUCTION.

As I am fully convinced, that a great population is the ſureſt indication of the happineſs of a nation, and the moſt certain preſage of its glory; and as I alſo know, that population cannot be advanced, or even continued in its preſent ſtate, but in thoſe countries in which the neceſſaries of life are to be obtained in plenty; I have thought it my duty to make a root generally known, which, in years of ſcarcity, will afford to men an healthful and agreeable food; which, when fodder is ſcarce or dear, will furniſh cattle, as well during the ſummer as the winter, with a cheap and abundant nouriſhment; which, at all times, and in all countries, may be certainly produced in great quantities; and of which the cultivation is ſimple, and the crop gathered in with little trouble, and which is eaſily preſerved.

The root, of which I have undertaken to give an account, is not known in France, or at leaſt very little. It has no proper name in French, and I have not been able to find a deſcription of it in any botanical work. In Germany, where the greateſt advantages have been derived from it, it is called *Dick Ruben*, (the Great Turnip); *Dick Wurzel*, (the Great Root); and *Mangel Wurzel*, (the Root of Scarcity). I have made uſe of the laſt denomination, *the Root of Scarcity*, (*Racine de Diſette*) becauſe it is a literal tranſlation of the name often given to it by the Germans, and becauſe it is expreſſive of the properties of the plant which it denotes. It might, indeed, be called *the Root of Abundance*, which would be no great deviation from the German name, and which would be expreſſive of one of the principal properties of this plant; which is, conſtantly to thrive, and to produce a very great crop, even when other kinds of roots and vegetables fail, and when there is a general ſcarcity of fodder.

This root ought not to be put into the claſs of turnips, nor into that of carrots; and although by its external appearance, and its ſeed, it very much reſembles the beet-root; it is ſuperior to it in every reſpect, and appears to form a diſtinct ſpecies.* Its culture is ſo eaſy, its advantages ſo numerous, and it will anſwer ſo completely the purpoſes of any other fodder, that it ſeems to me to deſerve to be adopted every where, and to have the preference, even in the beſt years, over all other roots with which beaſts are nouriſhed. It may be planted in open fields, and in lanes; it will ſucceed in all lands, and eſpecially in thoſe that are moiſt and light. If in hard and clayey grounds it is prevented from making its way far into the earth, it will extend itſelf horizontally, and will produce above the ſurface that which the nature of the ſoil hinders from being produced beneath it.

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* I ſhall here urge ſome reaſons, which appear to amount to certain proof, that the Root of Scarcity ought not to be confounded with the red beet root, nor with any kind of beets. If they do not ſtrip off the leaves of the Root of Scarcity, it does not grow to any great ſize, or at leaſt never arrives to the aſtoniſhing bulk in which we ſee it otherwiſe appear. If, on the contrary, they often ſtrip off the leaves of the red beet, it hardly thrives any more, it is enervated, its vegetation becomes languiſhing, and its root hardens; and beſides, it ſcarcely ever happens, that the leaves of the red beet have the ſame taſte with thoſe of the Root of Scarcity, or grow with the ſame rapidity, or attain to the ſame length.

As to the white beet, this cannot be compared with the Root of Scarcity; its leaves are curled, and have a very earthy taſte; its root is ſmall, ill ſhaped, forked, hard as a horn, and uſeleſs.

If the Root of Scarcity were the ſame as the red beet, would the farmer ſow ſo diſtinctly both the one and the other? Theſe two roots are equally known and cultivated in all the provinces of Germany; but the produce and the uſe of one being very different from thoſe of the other, they only cultivate the Root of Scarcity in large quantities.

The red beet, in all the provinces of Germany, has a diſtinct name, and is called *Rothe Ruben*; and they never give that name to the Root of Scarcity.

But it is of little conſequence to what particular claſs of roots this belongs, whether to that of beets, or to any other; that which is eſſential and inconteſtable is, that it unites in itſelf all the advantages which I attribute to it. I do not pretend to the merit of any invention, or to have communicated any new diſcovery; I have no other deſign than to make known to the public my experiments and obſervations. If the root, concerning which I treat, is known in ſome parts of the kingdom, which is very poſſible, the people muſt be ignorant of the manner of cultivating it, and of its advantages, ſince it is not ſo multiplied as it ought to be.

It is undoubtedly by miſtake, that ſome perſons have given the name of *turnips* to the Root of Scarcity. Monſ. Buchoz himſelf, in his work, entitled *Economical Manual concerning Plants*, has confounded theſe two roots; ſince he ſays, that the leaves of Engliſh turnips reſemble thoſe of red beet, which is not true; for the Engliſh turnips are in reality only a ſpecies of turnips larger than others, of which the rough and deeply cut foliage is exactly like that of all others, and they are cultivated nearly in the ſame manner. Mr. Buchoz, therefore, has been deceived by a miſtaken name; and what he has ſaid relative to the cultivation of turnips, applies only to that of the Root of Scarcity.

This moſt valuable root is not affected by the viciſſitude of the ſeaſons, and has no deſtructive enemy; the inſects and vermin, which make ravages on all other kinds of vegetables, neither touch nor injure it. It is not attacked by blaſting or mildew, and the greateſt drought does not affect its vegetation; it does not injure the ſoil that nouriſhes it; but prepares it to receive, before the winter, the corn and other ſeeds which may be intended to be depoſited in it.

In order to induce perſons to engage in the cultivation of a root ſo valuable, and to cauſe it to ſucceed in all hands, I ſhall point out the time and the manner of ſowing, tranſplanting, and cultivating it, and of gathering in the leaves; which ſucceed each other, without ceaſing, in the greateſt abundance, and which are highly uſeful, eſpecially for horned cattle. I ſhall treat of the crop of roots, of the manner of preſerving them, and of the method and time of re-planting them in order to obtain ſeed. I ſhall afterwards ſhew in what manner the roots are to be prepared for nouriſhing and fattening large cattle, and even for rearing young calves, that the owners are deſirous of weaning ſoon after their being calved. I ſhall ſpeak afterwards of the other advantages with which this root is attended. Laſtly, I ſhall make ſome other obſervations relative to different ſubjects of agriculture, of the value and utility of which I have been convinced by experience.

AN

ACCOUNT

OF THE

ROOT OF SCARCITY, &c.

SECTION I.

The Time and Manner of ſowing the Seed of the Root of Scarcity.

THE ſeed of the Root of Scarcity may be ſown as ſoon as the weather will permit the earth to be cultivated, from the end of February to the middle of April. This ſeed is ſown in the ſame manner as that of other roots that are tranſplanted; that is, either at random, or in lines, at the diſtance of five inches from each other: they cover it with at leaſt an inch of good earth. It is neceſſary that it ſhould be ſomewhat thinly ſown, becauſe the root is large, becauſe it will be eaſier to clear away the weeds, and becauſe the plants will be finer and more vigorous. This ſeed is commonly ſown in a garden, or in a piece of good land, well prepared.

§ II.

The Method of preparing the Earth into which the Roots are to be tranſplanted.

When the ſeed has been ſown, the field muſt be prepared into which the roots are to be tranſplanted. It is with theſe roots as with all other plants, the more the earth is manured, the more thoroughly it is ploughed and prepared, the finer and larger they become; and the crop of leaves is proportionally increaſed and multiplied. In a middling kind of land the roots produced do not weigh more than four or five pounds, and they do not produce leaves above four or five times; in a good ſoil they weigh from nine to ten pounds, and put forth freſh leaves eight or nine times.

In 1784, I planted ſome, by way of experiment, in a very middling ſoil, and the fineſt did not weigh more than five pounds. In 1785, I cauſed them to be planted in a good corn field, but the land of which was cloſe and hard, and in which they made their way into the earth with ſome difficulty: they weighed, however, from ſeven to ten pounds. In a light, ſandy, and rich ſoil, they grew ſtill larger; ſome of them weighed fourteen, and even ſixteen pounds.

OBSERVATION.

Although the moſt favourable ſeaſon, for ſowing the ſeed of the Root of Scarcity, is from the month of February to the middle of April, it is nevertheleſs advantageous to ſow ſome every month, even till June; as by that means there will always be plants fit for tranſplanting: and wherever there is a void place, either in gardens, or in fields, there they may be planted. In 1784, the fly having four times deſtroyed the turnips that I had ſown, I ſupplied their place with Roots of Scarcity; it was in the month of Auguſt, and I nevertheleſs gathered the leaves three times, and the roots weighed from three to four pounds. In hemp fields, after the crop of hemp has been gathered in, the Roots of Scarcity may then be planted; and this ſecond produce, although of a very different nature from the firſt, will notwithſtanding anſwer very well.

§ III.

The Time and Manner of tranſplanting the Root of Scarcity.

Towards the beginning of the month of May, the land being well broken up by the ſpade, or by the plough, and well prepared and levelled by the rake or the harrow, it is then proper to take a view of the plantation. If the roots are five or ſix inches in length, and if they are as large as a ſtrong gooſe quill, they may be drawn out of the earth. None of their fibres ſhould be cut off, but the leaves ſhould be cut cloſe at top, as is done with endive. Taking afterwards a plantingſtick, make in the earth holes, from four inches and a half to five inches deep: theſe holes ſhould be made in a right line, and chequer-wiſe, at the diſtance of eighteen inches from each other. A root ſhould be put in every hole, placed in ſuch a manner, that the tops may be ſeen a little way out of the earth. This is an eaſy precaution, but very eſſential, and without which they will never ſucceed well; theſe plants take root in twenty-four hours; and a man, who is a little accuſtomed to it, may plant 1800 or 2000 in a day.*

§ IV.

The Firſt Crop of Leaves, and Method of cultivating the Root.

At the end of June, or on the firſt days of July, when the outward leaves are become about a foot long, the firſt crop of leaves is to be gathered, breaking them off round and near the root. For this purpoſe, the thumb ſhould be placed within, and at the origin of the leaves, in order to ſtrip them off, cloſe to their inſertion into the ſtem. Thoſe leaves only ſhould be gathered which bend towards the earth, and care ſhould always be taken to leave thoſe of the heart of the plant: they will thereby be re-produced, and grow more quickly. Immediately after this firſt crop, the ground ſhould be turned up once or twice with the mattock of the roots. In digging the earth this ſecond time, the root ſhould be raiſed high with a ſpade, and the ſurface of the earth ſhould be turned up afreſh, ſo that every root ſhould be cleared for an inch and a half, or two inches: they will then appear as if they were planted in a ſmall baſon, of nine or ten inches in diameter. Even a child might eaſily perform this operation. In light lands, it will be ſufficient to clear away the weeds, and to dig up the earth with the ſpade. After this ſecond operation, which is a very eſſential one, nothing more is neceſſary but to gather in the crop. It is from this moment that the roots begin to grow large, and to increaſe in an aſtoniſhing manner; and it is not advantageous to them to have other encroaching vegetables for their neighbours: for both air and room are neceſſary, in order to give full effect to their inconceivable power of vegetation.

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* Many perſons have found it difficult to procure ſeeds of the Root of Scarcity, from one end of the kingdom to the other, they have ſolicited me to render it eaſy to get them at Paris for the following year. I have been happy enough to prevail on M. de la Planche, a reſpectable apothecary, in the *Rue du Roule*, at Paris, to furniſh his ſhop with a quantity of them, which I have procured for him. He ſells them at four *livres* a pound; the prodigious quantity of theſe ſeeds that have been called for, having rendered them ſcarce and dear.

Thoſe perſons, who are deſirous of having any for the following year, are requeſted to write to M. de la Planche in the month of November, in order to determine what quantity it will be neceſſary to provide. It is only towards that time that the price can be fixed, which varies according to the nature of the harveſt. Perſons ſending orders are requeſted to ſend their addreſs; and it is alſo deſired, that their letters be poſt-paid, and that they remit half the price of the ſeeds ordered, at the rate of four *livres* per pound. The other half is to be paid, on receiving the ſeeds ordered, in January, 1787. The ſeeds will be ſent in that month, agreeably to the addreſs communicated, and by the mode of conveyance that ſhall be directed.

Theſe perſons, to whom, from their ſituation, it may be more convenient to apply to me to procure them theſe ſeeds, may ſend to me the ſame previous notice, and may depend upon receiving them at the ſame time. It is deſired that, in both caſes, the letters and the money may be ſent free of expence.

§ V.

The Produce of Leaves.

In a good land, the leaves may be plucked off theſe roots every twelve or fifteen days. I have remarked, more than once, that, in the ſpace of twenty-four hours, their leaves increaſe from 25 to 30 lines in length, from 18 to 20 in breadth; and alſo, that at the ſecond crop, they have been from 28 to 30 inches in length, and from 20 to 22 in breadth. This account will appear exaggerated, till experience ſhall have demonſtrated its truth.

§ VI.

Their Uſe for Cattle.

Oxen, cows, and ſheep, readily eat theſe leaves; they nouriſh them, and they are even fattened by them.

They are given to them entire, as they come from the field. Poultry will eat them, when cut ſmall, and with bran. Even horſes will like theſe leaves very well, and may be fed with them during the winter. Nothing more is neceſſary for this purpoſe, but to cut them ſmall, with ſuch an inſtrument as I ſhall deſcribe, when I come to ſpeak more particularly of the roots. Hogs will eat theſe leaves very willingly.

MATERIAL OBSERVATIONS.

After repeated experiments, well eſtabliſhed, and made under my own eyes, I may venture to aſſert, that milch cows, and which it is intended to continue as ſuch, may, without the leaſt inconvenience, eat of theſe leaves, for their whole nouriſhment, during eight, and even to fifteen following days. From the very firſt days, they will give a greater quantity of milk, and cream of the very beſt quality: but if they ſhould be continued to be fed with this forage only, it would ſoon be apparent, that they fattened at a ſurpriſing rate; in a ſhort time the milk will diminiſh, and the ſubſtance turn entirely to fat. Theſe leaves produce the ſame effect on ſheep and oxen; from whence a judgment may be formed of the great facility with which they may be fattened, by this ſpecies of nouriſhment alone.

In order to keep milch cows in ſuch a manner, as to cauſe them to continue to produce their full quantity of milk, it is neceſſary to mix with theſe leaves, from time to time, a third or a fourth part of that kind of graſs or herbage, with which they have been generally nouriſhed. This graſs, or herbage, may be given to them once every day; or one day in three they may be fed with it entirely. By this ſimple method only, the cows will always be rendered aſtoniſhingly productive, and their milk will be excellent. Theſe obſervations refer only to thoſe cows, which are conſtantly fed in ſtalls.

When there is an appearance of rain, or bad weather, a ſufficient quantity of the leaves ſhould be provided for two or three days; but it is neceſſary to turn up the heap into which they are formed, in order to prevent their being too warm. The repeated crops of their leaves do not give more trouble than any other kinds of green forage, which it is neceſſary to mow, to reap, or to gather in fields or meadows, and which muſt equally be collected together, and conveyed into barns or ſtables. If there be any difference, it is in favour of the leaves of the Root of Scarcity; which a child may break off and gather, while it is neceſſary that men ſhould be employed in mowing other kinds of forage.

When a quantity of this root is planted, proportioned to the number of cattle which are to be fed or fattened, we may be certain of being able to furniſh them with leaves enough for the time they will be wanted, even during the greateſt and the longeſt droughts; in ſhort, to the very time in which they may begin to eat the roots. I have endeavoured to reduce the leaves of the Root of Scarcity to dry forage, and I have ſucceeded; but I would not adviſe any perſon to repeat the experiments that I have made for this purpoſe. The trouble of collecting and preparing them for dry forage, and the little advantage that they were productive of in this way, cauſed me to renounce the deſign of making this uſe of them. Theſe ſoft and tender leaves are withered by the heat of the ſun: it requires much time to dry them out of it; the leaſt rain, even the dew itſelf, rots and reduces them to nothing; they diſappear, as if they had been in an oven. The only method of ſucceeding then is, to paſs a thread through the middle of every leaf, and to hang them to dry in the air; but a cow would eat as many of theſe dried leaves in one day, as would nouriſh it for eight when they were green. This operation is alſo too long, too troubleſome, and too expenſive, for the inhabitants of the country: but the great utility of the root itſelf will more than counterbalance this difficulty.

§ VII.

The Uſe of the Leaves for Men.

The leaves of this root will alſo afford to men an wholeſome and agreeable food; they have not an earthy taſte, like beets; their taſte reſembles that of the *Cardon d'Eſpagne*, and they may be eaten in the ſame manner. They may be dreſſed in different ways; they are conſidered as a kind of ſpinage, and are preferred to it by many perſons; they may be eaten from the ſpring to the month of November; by their continual re-production, and great abundance, they are highly uſeful to farmers, to country people, and in all houſes in which there are many Servants. The roots, when dreſſed, they may eat themſelves in the winter; and they may be dreſſed many ways. The Root of Scarcity is a very good root, of an agreeable taſte, much ſuperior to the red beet, and at leaſt equal to the turnip. The leaves which the roots, when kept in a cellar, produce during the winter, are very tender, and extremely delicate in ſide diſhes.

§ VIII.

Crop of the Roots.

The commencement of ſharp froſts determines the time for the crop of roots: in 1785, I began on the 14th of November; in 1784, I had been obliged to do it on the 15th of October. A fine day muſt be choſen for gathering in this very valuable crop, though at the hazard of doing it many days before it is neceſſary: it is important to the preſervation of this root, that it ſhould be kept perfectly dry. The day being fixed, theſe roots ſhould be gathered in the morning, and left upon the place whereon they grew, that they may be dried by the air and by the ſun. Children may follow thoſe who reap the roots, and may cloſely cut off all the leaves. This operation may be performed the evening before, or even ſome days before the harveſt. In the evening all the roots ſhould be collected together; if they have been well aired, they may be put under cover in a cellar, or in any other dry place, where they are not in danger of being hurt by the froſt; if there is no reaſon to be apprehenſive of rain, they may be left in the field in which they were gathered during the night, and removed the next day to the place in which they are to be depoſited. If the weather will permit them to be left in the air two or three days, it will be advantageous to them. They ſhould not be handled roughly, either in removing them, or in diſcharging them into the cellar, or other place where they are to be kept; for as they have a very thin rind, they are eaſily bruiſed, and then they do not keep ſo well.

§ IX.

Of the Choice of thoſe Roots which ſhould be preſerved for producing Seed.

The time of gathering in the crop is the ſeaſon for chooſing thoſe roots which are proper for producing ſeed. Thoſe which are only fit for this purpoſe, are thoſe which have attained to a middling ſize, which are ſmooth, even, of a roſe colour without, and white within ſide, or marbled with red and white: ſuch are the marks which diſtinguiſh thoſe which it is proper to preſerve and cultivate. Thoſe which are all white, or all red, are either degenerated, or are true beets, of which the ſeed, by the neglect of the cultivators, has been mixed with that of the Root of Scarcity. The roots which are intended for the production of ſeed, ſhould be kept ſeparately from the others, in a place where they are ſecured from dampneſs and from froſt.

§ X.

The Time and Manner of re-planting thoſe Roots which are intended to produce Seed.

At the beginning of April, thoſe roots ought to be put into the ground which are intended for ſeed; they ſhould be placed at the diſtance of three feet from each other; as their ſtalks are from five to ſix feet in length, it is neceſſary to give them fences of ſeven feet in height, ſunk a foot and a half into the earth; theſe fences ſhould be interwoven with ſmall twigs, and ſhould form a kind of hedge-row. Againſt this hedge-row the ſtalks ſhould be tied, in proportion as they extend in length, that they may not be broken by the wind.

§ XI.

§ XI.

The Crop of Seed, and Manner of preſerving it.

This ſeed commonly ripens towards the end of October; it ſhould be gathered immediately after the firſt white froſts appear; then the ſtalks ſhould be cut, and, if the weather will permit, they ſhould be raiſed up againſt a wall, or paliſade; if the weather be bad, they may be tied together in handfuls, and hung up under ſhelter in an airy place, till they are well dried. The ſeed may be then taken, and preſerved by being put into bags, as is done by other garden ſeeds.

Every root, when tranſplanted, may produce from ten to twelve ounces of ſeed.

§ XII.

The Manner of preventing the Roots from degenerating.

The ſeed of the Root of Scarcity degenerates, like all others, if care be not taken to change the ſoil every year, or at leaſt every two years; that is to ſay, to ſow in a firm ſoil that which has been produced in a light and ſandy ſoil, and in a light ſoil that which has been produced in a firm and hard ground. Thus the cultivators of theſe two kinds of land, by every year changing their ſeeds, will afford to each a reciprocal benefit. This ſeed may be preſerved in its full perfection for three or four years.

§ XIII.

The Means of preſerving theſe Roots from the Month of November to the End of June.

If the ſtock of roots be conſiderable, and if they cannot be depoſited in the houſe, it is neceſſary, many days before the crop, to cauſe ditches, or trenches, to be dug in the ſame field, or in ſome other place, which during the winter may be ſecured from rain; after having left the inſide of theſe ditches to dry, during eight or ten days, you may put a little ſtraw at the bottom, and at the ſides; you may then place your roots, one by one, in theſe ditches, handling them gently, and taking the precaution of clearing them from all the earth which ſurrounds them. You are then to cover the laſt roots with ſtraw, and to throw upon that ſtraw three feet of that earth which has been dug out of the ditches. You ſhould beat this earth well, and form it into ſuch a ſhape, with ſhelving ſides, that the water may run from it the more eaſily.

§ XIV.

The Dimenſions of the Ditches, or Trenches.

The dimenſions of theſe ditches ſhould be proportioned by the height of the ground, or to its declivity. They may be made from two to four feet in depth; their length is indifferent, and depends upon the quantity of roots to be depoſited in them; their breadth is generally about three feet and a half.

As theſe roots have the very beneficial property of keeping without alteration to the month of June, it will be advantageous to multiply the ditches, and to make one for every month's conſumption, beginning with the month of March, that being the time about which there is generally an end to the ſtores of proviſion collected from winter conſumption. I recommend multiplying the ditches, becauſe that theſe roots, when they are expoſed to much air, after having been long deprived of it, will not keep for a long time freſh; and this inconvenience may be prevented by multiplying the number of ditches.

§ XV.

The Neceſſity and Manner of making a Vent.

It is abſolutely neceſſary that every ditch ſhould have a vent, by which the fermentation of the roots may be exhaled: without this precaution, all that you attempt to preſerve under-ground, will be rotted or ſpoiled. I will point out the manner in which this vent ſhould be made. Before any thing is put into the ditch, you ſhould ſet up in the middle of it a ſmall pole, of ſix or ſeven feet in length, and two inches in diameter; then place your roots in the ditch, and diſpoſe them in ſuch a manner as to make a ſloping heap, raiſed in the middle, with ſhelving ſides; when the ditch is full, and the roots are raiſed in the middle, half a foot above the level of the earth, you ſhould twiſt round the pole a rope of hay about an inch in thickneſs, taking the precaution not to bind it too hard; you ſhould then throw the earth over it, placing it, and beating it down, in the manner that has been before mentioned. When the ditch is well covered in, and finiſhed in form of a coffin, you may then pull out the pole, the hay will remain in the hole, and the exhalations, which the roots throw out in fermentation, will evaporate through that paſſage. At the end of a few days, you ſhould cover this hole with a bit of hollow tile, and when the ſevere froſts come, you ſhould ſtop it up with a flat ſtone.

§ XVI.

The Manner of preparing the Roots for the Nouriſhment of Cattle.

In order to cauſe theſe roots to be eaten by all kinds of cattle, it is neceſſary to cut them into ſmall pieces, after having well waſhed and cleanſed them. We employ for this purpoſe a ſharp inſtrument, made of a blade of iron a foot long, and two inches broad, and twiſted into the form of an S; in the middle of the two branches of the S is ſoldered a ſocket of about two inches long; in this ſocket is fixed a wooden handle of about three feet ſix inches in length; with this inſtrument, which at firſt view, appears intended to imprint the letter S upon any body, they cut theſe roots with as much regularity as facility. This operation is performed in a tub or trough intended only for this purpoſe. A man may in one hour's time cut into ſmall pieces a quantity of roots, ſufficient for the nouriſhment of twelve oxen for a day. Before the roots are caſt into the trough, it is neceſſary to ſplit them, and cut them into quarters. It is advantageous to mince theſe roots into ſmall pieces, of the ſize of a nut. I have remarked, that when this is done, cattle thrive better with them.

§ XVII.

For Horned Cattle.

Prepared in this manner, theſe roots may be given, without any mixture, to any horned cattle, and to ſheep, eſpecially to thoſe that are to be fattened; but if it be neceſſary to huſband the roots, there may be mixed with them a quart or more of hay and of chopt ſtraw; it is even advantageous to obſerve this method, during the three or four firſt weeks, with the lean cattle that are intended to be fattened: the hay of trefoil, of lucerne, and ſainfoin, &c. is the beſt for this purpoſe.

Thoſe perſons who have, or will procure, an inſtrument for cutting dry fodder, ſimilar to that which is ſucceſsfully and advantageouſly made uſe of in Germany will ſave much time, and waſte leſs of their proviſions.

§ XVIII.

For Horſes.

During all the winter horſes may be fed with this root, adding, however, half ſtraw and hay, cut and mixed together. Being thus fed, they will become fat, ſtrong, and ſleek; but when they are hard worked, it will be neceſſary to add from time to time a few oats. This is the practice in thoſe provinces of Germany, in which this root almoſt ſupplies the place of meadows, and of which the breed of horſes is well known, and eſteemed.

Hogs will alſo readily eat theſe roots when cut ſmall, raw, and mixed with the fat or milky drink, which is generally given them. They will become as fat by eating theſe roots, as other ſwine will by different kinds of food, which are obtained with more expence and trouble.

§ XIX.

Of the Quantity of theſe Roots, to be given to different Kinds of Cattle.

The quantity of theſe roots, that ſhould be given in a day to eat to different kinds of beaſts, ſhould be regulated by that of the dry fodder that is given them, and which, indeed, ought always to be added (for it is neceſſary every day to give them a little before they are made to drink); and this quantity ought alſo to be proportioned to the ſize and condition of the beaſts. Regard is alſo to be had to the views of the owners reſpecting the beaſts: thoſe that are fed in order to be kept, ſhould eat leſs than thoſe which are intended to be fattened for ſale. As the ſize of theſe roots is different, according to the goodneſs of the ſoil which produces them, we cannot fix the quantity by the number of roots, nor can we aſcertain the quantity to be given to every beaſt by weighing the roots; many perſons would neither have time nor conveniencies for weighing them; and I ſhall content myſelf with relating the following facts, which will throw upon this ſubject all the light of which it is ſuſceptible.

In the month of May, 1785, I planted ſixteen thouſand and ſome hundred of theſe roots, in a field containing two acres and an eighth, Heidelburgh meaſure; this meaſure is the ſame, as I am aſſured, as that of Lorrain; the acre containing 250 roods, the rood ten feet, and the foot ten royal inches. From the beginning of July, till the 15th of November, ſeven cows and three calves were conſtantly fed from the produce of the leaves, mixed with a third or fourth of other herbage, as I have before mentioned; and from the 20th of November they eat the roots cut ſmall, in the manner that I have already pointed out. The cows had two meals a day, each conſiſting of ſixteen or eighteen pounds of roots, mixed with four pounds of chopt ſtraw or hay: with this nouriſhment their milk was as good, and as plentiful as it had ever been, and they were in the beſt condition poſſible.

§ XX.

The Method of fattening Oxen.

I fattened four very lean oxen; and gave at firſt to each, twice a day, twenty pounds of theſe roots, mixed with five pounds of after graſs, or of chopt hay. At the expiration of a month, in conſequence of inſtruction that I had received from an intelligent and obſervant farmer, I cauſed their chopt hay to be omitted, and ſubſtituted five pounds of roots in its room. Thus they lived, for two months, upon roots only; and at the end of three months, they were ſufficiently fat for ſale. They always readily devoured this food, becauſe it is well-taſted, tender, and requires no preparation. I have remarked, that it is advantageous to give to oxen, as well as to cows, their day's allowance, at two or three times; they will thereby fatten ſooner, and there will be nothing ſpoiled or loſt, as often happens, when their day's allowance is given at once.

From this recital, which is exact and faithful, it will be eaſy to conclude what quantity of roots are neceſſary for nouriſhing a cow, and fattening an ox; how much an acre of land may produce, when the roots are planted at eighteen inches diſtant, agreeably to what I have already ſaid; and how many oxen may be fattened, or cows kept, with the produce of an acre.

Four months are commonly requiſite for fattening an ox, with the proviſions that it is uſual to make them eat. Now theſe roots will keep eight months in the year; and the leaves, which anſwer the ſame purpoſe, will furniſh nouriſhment for the four other months; the cattle then to be fattened with theſe roots may be renewed three times in the year; or thoſe whom it is propoſed to keep, may be fed conſtantly with them, during the whole courſe of the year.

§ XXI.

The nett Produce of an Acre *of Land, Lorrain Meaſure.*

In order to ſave cultivators ſome trouble, in calculating what quantity of roots may be produced in an acre of land, Lorrain meaſure, which is nearly equal to half an acre of France, I will ſtate here the method of proceeding in that calculation, and of ſhewing the reſult. The acre of land contains 250 ſquare roods, the rood contains ten feet, and the foot ten royal inches; the *arpent* then comprehends 2,500,000 ſquare inches of ſurface; but every ſquare of 18 inches contains (multiplying 18 by 18) 324 ſquare inches; and thus, in dividing 2,500,000, by the number of ſquare inches neceſſary to every root, it will be found, that 7,716 roots may be planted in an acre of Lorrain, placing them at 18 inches diſtance: there remains, indeed, a fraction in this this calculation; but may be diſregarded.

As to the weight of the roots, as that depends upon the goodneſs and nature of the ſoil wherein they are planted, it muſt conſequently depend upon the choice made of the land. But it may here be obſerved, that if the land be but middling, and little dunged, theſe roots may be planted a foot, or fifteen inches diſtance from each other; but, in a good ſoil, eighteen inches ſhould always be allowed.

Many of the inhabitants of Puttelange, and all the farmers who have imitated me, have ſucceeded as I have done; but thoſe who have not conformed to my directions relative to the plantation and culture, thoſe who have ſunk their plants too deeply into the earth, thoſe who have ſet them too near to each other, or who have mixed them with other kinds of roots, and who have not attended properly to their cultivation, have not ſucceeded: they would undoubtedly have attributed to the nature of the root, and to the ſoil, that want of ſucceſs which was the effect of their negligence, if many of their neighbours had not ſucceeded.

If in every province ſome perſon could be found ſufficiently benevolent to ſow a large quantity of the ſeed of the Root of Scarcity, and to diſtribute the plants to all thoſe who ſhould be deſirous of cultivating them; if ſome one ſhould alſo condeſcend to teach at the ſame time, the methods of planting, cultivating and uſing them, he would certainly render a very important ſervice to the inhabitants of the country, to thoſe who cannot derive information from the Memoirs which are publiſhed by government, or by the learned; becauſe they are neither acquainted with them, nor underſtand them; and are ignorant even of the exiſtence of thoſe periodical publications, which frequently announce uſeful diſcoveries, and intereſting inventions. The inhabitants of the country continue in a ſtate of ignorance, only becauſe pains is not taken to communicate inſtruction to them; they live in a ſtate of apathy, only becauſe the proper meaſures are not adopted for awakening their induſtry, and exciting their ardour.

The keeping a cow will greatly contribute to the felicity of the family of the labourer and the mechanic, &c. He who has not hitherto been able to do this, becauſe he has not been able to feed one, may eaſily in future enjoy this advantage; let him rent but a little ſpot of ground, and there cultivate the Root of Scarcity, and he may keep his cow; and the milk which ſhe will produce, in leſs than a month will pay the rent of his ground. The peaſant who has hitherto been able to keep but one cow, will be enabled to keep two or three, if he will apply himſelf to the cultivation of the ſame root.

§ XXII.

Farther Advantages reſulting from the Cultivation of the Root of Scarcity.

Beſides the advantages which I have already enumerated, the Root of Scarcity alſo poſſeſſes many others; and I ſhall here particularly mention the certainty of an abundant crop, however intemperate may be the ſeaſons.

If this Root be cultivated, it will not be neceſſary that cattle ſhould paſture in the meadows, and eat the produce of them during the ſummer; but all the graſs which the meadows produce, may then be converted into hay. How much, indeed, may they not ſell of it, ſince, even during the winter, they may at leaſt ſave two-thirds of it? And, in ſhort, as the Root of Scarcity will render it eaſy to feed beaſts in the ſtable during the whole year, this circumſtance will alſo greatly increaſe the quantity of dung, which is ſo neceſſary in agriculture.

In conſequence of theſe advantages, forage may always be kept at a moderate price; for this root yields a much greater produce than other kinds of forage, and ſurpaſſes them even in thoſe years in which they are the moſt favourable. When this root is become ſufficiently known, cultivators will undoubtedly prefer it to all the other kinds of forage.

The numerous experiments that I have made, eſpecially in the year 1785, relative to the culture, the produce, and the uſe of the Root of Scarcity, have convinced me, that it deſerves to obtain a decided preference over all other roots, and even over turnips. Whether I am partial, or enthuſiaſtick in my attachment to it, may be determined by conſidering the reaſons which I am now about to enumerate.

§ XXIII.

Recapitulation.

1. This kind of Root may be eaten by men during the whole year: it is agreeable and wholeſome, and does not cauſe flatulencies, as turnips do.

2. As the Root of Scarcity is not attacked by the caterpillar, or by any other inſect, its ſucceſs is certain every where: it ſuffers nothing from the viciſſitude of the ſeaſons. Neither our own turnips, nor thoſe of England, poſſeſs theſe advantages.

3. The leaves of the Root of Scarcity afford an excellent food for all kinds of cattle, during four months in the year; whilſt turnips produce leaves only once a year, and even then are tough, and injured by inſects.

4. The Root of Scarcity may be well preſerved during eight months in the year, and are not ſubject to become rotten, as is the caſe with turnips; which from the end of the month of March, become ſtringy, tough, and ſpungy.

5. There is no kind of turnips which ever ſucceeds perfectly; they often fail entirely, eſpecially in hard lands; they require a light, good, and ſandy ſoil; but the Root of Scarcity will ſucceed every where; the cultivators of different kinds of lands may be equally aſſured of ſucceſs; and farmers and labourers may be greatly benefited by this reſource.

6. The milk produced by cows who have been nouriſhed for ſome days together with turnips, contracts a taſte like tallow, or ſtrong, ſour, and diſagreeable; but thoſe, who are fed with the Root of Scarcity, produce both milk and butter of an excellent quality.

After this parallel, which I have made with an exact regard to truth, and which will undoubtedly be verified by all thoſe for whom I have procured the ſeed of the Root of Scarcity, it will no more, I hope, be confounded with turnips; not even with that large ſpecies of them, which has been long known and cultivated in Germany, but which now is neglected, on account of the inconveniencies that I have pointed out.

This excellent forage will afford ſubſiſtance to all kinds of cattle, and eſpecially at that time when graſs, ſo uſeful and neceſſary to cattle, is yet ſcarce; and it will be ſeen, by their vigour and their ſleekneſs, how much it has contributed to their health.

The Root of Scarcity is never diſliked by cattle; they eat it always with the ſame avidity, and the ſame pleaſure; and they have nothing to fear from thoſe unhappy accidents, which ſometimes reſult from the uſe of turnips. How much is it to be wiſhed that theſe united advantages, which are founded upon conſtant experience, may deſtroy that diſtruſt, and thoſe prejudices, which this new Root may, perhaps, at firſt inſpire among the French; for it is only in ſome provinces of Germany, in which it is cultivated with the greateſt ſucceſs, that the preference is given to it over every other kind of fodder, and in which it is employed for fattening the greater part of thoſe herds of cattle, which are every year brought for ſale into this kingdom.

I ſhall eſteem myſelf happy, if the truths which I have ſtated ſhould encourage the cultivation of a root, which may increaſe the riches of the ſtate, and contribute to the eaſe and to the happineſs of the people.

§ XXIV.

Of the Manner of bringing up Calves, by weaning them at twelve Days old.

The ſcarcity of fodder having obliged farmers to kill many cows, and having hindred them, for two or three years, from bringing up the number of calves that they have generally been uſed to do, the price of proviſions, of butter, and of milk, has been increaſed in ſuch a manner as was never before known. In order to ſtop the progreſs of this advance in the price of proviſions, which ſeems as if it would become ſtill more conſiderable, it is neceſſary to encourage country farmers to apply themſelves ſtill more than ever to the breeding of horned cattle; the Root of Scarcity will furniſh them with the means, and will deſtroy the pretext commonly employed by farmers, that they cannot deprive themſelves of the milk of their cows, which is ſo neceſſary for their own ſubſiſtence, and that of their families. By making uſe of the Root of Scarcity, they may, with a little care and trouble, wean, at ten or twelve days old, thoſe calves that they are deſirous to rear.

From the third day, it is neceſſary, once a day, to give to calves newly calved a little milk lukewarm, in a wooden bowl; whether they drink it, or not, is of little conſequence; it will be ſufficient, if they moiſten their lips with it. They will drink it willingly when they are eight or ten days old; and from that time they ſhould no more be ſuffered to approach their dam: they ſhould then give them to drink, morning and evening, during three or four days, milk from the cow; and at noon, inſtead of milk, ſome warm water, in which a little flour is mixt, ſhould be given them. From the time they are twelve days old, no more milk unmixt ſhould be given them, either morning or evening; but only water, lukewarm, mixed with flour and a little milk: this regimen ſhould be continued during four or five days; after which they ſhould be fed in the manner following.

From the fourth day, a little bran, in the palm of the hand, ſhould be offered from time to time to the calf; when it begins to lick the bran, a ſmall quantity of it ſhould be laid before him, and a handful of hay; and this ſhould be continued till the twelfth day, the time in which he will have learned to eat. It is neceſſary to take care, that the place in which this food is put ſhould be very clean, and that it be ſwept every time freſh food is given. After the expiration of twelve days, there ſhould be given him, every day, three times a day, leaves of the Root of Scarcity, cut ſmall, and mixed with one third hay; and twice a day he ſhould have clean water given him to drink. If it be winter, the root itſelf will ſupply the place of the leaves. When the calf is four or five weeks old, the bran may be omitted, and it may be fed with ſtraw and hay cut ſmall, and mixed in equal quantities with the roots or with the leaves. It will be neceſſary every time to take away all that the calf ſhall have left, and to give him his proviſion quite freſh, that he may not be diſguſted with it. The calves, who are brought up in this manner, will graze when they are ſix weeks old, and will ſucceed very well, as I have proved by experience.

§ XXV.

Of the Culture of Carrots, in thoſe fields in which Barley has been ſown.

To the preceding obſervations concerning the Root of Scarcity, I think it alſo proper to add thoſe that I have made relative to ſome other objects of agriculture, little known or little practiſed, in Lorrain, and in the biſhopricks; and which may, notwithſtanding, be uſeful to the inhabitants of the country, in good as well as in bad years.

In all good lands, but eſpecially light and a little moiſt, which are deſigned for the production of barley, a double crop may always be obtained. When the barley is ſown, and buried under-ground by the plough, or by the harrow, the ſeeds of carrots may be lightly ſtrowed over the field, and the roller may be paſſed twice over it, which will be ſufficient to bury the ſeed under-ground. As the barley will not hinder the carrots from thriving, a rich crop may be gathered in the month of November. If there is time to clear and to weed the carrots, they will be the finer. No one can be ignorant, that carrots are an excellent food both for men and for beaſts. Many perſons are accuſtomed to cut the leaves of carrots at different times; but I have obſerved, that this operation hardens them, and tends to impede their vegetation.

§ XXVI.

Of the Culture of Spurrey, and its Advantages.

The *ſpergula*, or ſpurrey, is a plant which may be made uſe of in the year in which it is ſown, and which re-produces itſelf by its ſeed and not by its root. The cultivation and the uſe of this root are ſo totally unknown in this province, that even its name is hardly known. This kind of fodder is, however, extremely advantageous, and is ſo productive, and ſo quick in its growth, that it may almoſt be procured in the moment of need; and in light lands, neither plough nor horſes are requiſite for its cultivation. After the crop of corn, may be ſown four or five pounds of this ſeed upon the ſtubble in an *arpent*[*] of land; and the earth muſt be ſwept three or four times with a bundle of thorns. In about five or ſix weeks there will be found in this field an abundant paſture for horſes, oxen, cows, and ſheep. The cows which are fed with this fodder, give a great abundance of milk of the very beſt ſort; and the butter that they produce is the beſt that can be for keeping. In Brabant and in Holland, where this kind of fodder is the moſt cultivated, the butter that is produced by the cows which are fed with it, is ſo much eſteemed for its goodneſs and its firmneſs, that thoſe veſſels, which are intended for long voyages, are particularly provided with it; and it goes by the name of *ſpurrey butter*.

When they take the advantage of a day of rain in order to ſow the ſpurrey ſeed, it ſprings up from the fourth day. In hard lands, it is neceſſary, before ſowing the ſeed, to paſs an iron harrow over the ſtubble; and, after the ſeed has been ſown, to make uſe of a bundle of thorns. The ſeed of this forage may be procured from the cornfactors, or may be ſent for from Antwerp.

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[*] An *arpent* is a meaſure of land, containing 100 perches ſquare, of ten feet each.

In order to naturalize ſputrey in our country, it is neceſſary to ſow it in the month of April, and to reap it in the month of Auguſt. The hay that it produces, although of a diſagreeable ſmell and colour, is eaten with avidity by horſes, oxen, cows, and ſheep. They prefer it even to the beſt hay, and it is extremely nouriſhing. All poultry, and eſpecially pigeons, will eat this kind of ſeed, in preference to any other.

§ XXVII.

A Method of procuring a Supply, in caſe of a Scarcity of Hay.

It appears from experience, that when the months of April or May are dry, and there is much violent wind, the harveſt of hay is far from being abundant. In order to procure, at ſuch times, a ſupply of fodder, it is requiſite that prudent and vigilant farmers ſhould then cultivate a part of their fallow lands; and they ſhould ſow rice, barley, and oats, mixed with vetches and lentiles. At the beginning of Auguſt, when the rice begins to grow to an ear, they mow and make hay of the ſtalks of theſe plants, and thereby ſupply the deficiency of hay from the meadows; and the fields which have produced this hay will again furniſh the ſame kind of paſture. This ſeed-time may be the better attended to by huſbandmen, as their principal labours will then be ſuſpended.

§ XXVIII.

A new Method of making Hay from the Produce of artificial Meadows.

In this province they are happily in the cuſtom of ſowing much trefoil, lucerne, ſain-foin, &c. but as few perſons are acquainted with the proper method of reducing theſe plants into dry fodder, almoſt every body deſtroys the leaves and the flowers, which are the beſt part, and leave only the ſtalks. I ſhall, therefore, point out the manner of avoiding theſe inconveniencies.

It is neceſſary that ſtakes ſhould be provided of eight or nine feet in length, about the thickneſs of a man's arm; the quality of the wood is indifferent. In theſe upright ſtakes, holes ſhould be pierced on all ſides, fifteen inches one from the other; and through theſe holes ſticks ſhould be put of an inch and a half in diameter, and about four feet in length. Theſe ſtakes ſhould be driven into the earth, at equal diſtances, in the field which they are about to mow. They are not unlike the perches that are made for parrots, or for turkies.

The graſs ſhould be mowed when it is in full flower, and taken up by armfuls, as it falls under the ſcythe, and laid upon theſe ſtakes and twigs. There it ſhould be left without being turned or touched, till it is quite dry, and then it may be removed into the hay-loft; and by this method neither the ſeeds nor the leaves of the plants will be loſt. Bad weather will not hurt hay which has been thus managed; rain will not continue upon it, and the air will dry it more readily and more equally than upon the earth. Spurrey, which is a very thick graſs, may be made into dry fodder in the ſame manner. The crop of hay being gathered in, the ſtakes may be taken out of the ground; and, if preſerved with care, they may be uſed for the ſame purpoſe many years ſucceſſively.

The repeated experiments which have been made on the Root of Scarcity, in all the provinces of France, having been crowned with the greateſt ſucceſs, the Abbé de Commerell hopes to be of ſervice to farmers, by communicating to them the following new, and more ſimple and eaſy method of managing this root, which he practiſed with great advantage during the laſt year.

In the months of March and April, the land being well prepared, manured, and made light, the largeſt and ſoundeſt Root of Scarcity ſeed muſt be choſen, ſteept in water for twenty-four hours, and then dried a little, ſo that they may be handled.

Lay the line upon the field, as if you were to plant the roots at the diſtance of nineteen inches on each ſide; make, with the finger, holes one inch deep, in each of which put *one grain only*, which is to be immediately covered with the earth. After ten or twelve days it will ſhoot, and every grain will have four, five, or ſix roots growing together. As ſoon as theſe ſmall roots ſhew their fourth leaf, the feebleſt of them muſt be carefully plucked off, and the fineſt and moſt vigorous root only left. In a little time the growth of the roots thus ſelected will be aſtoniſhing; not one will fail. After this manner, equally ſimple and eaſy, the tranſplanting of the roots is avoided, and leaves obtained four or five weeks ſooner; the roots grow finer and larger, and deepen better; and, in a light land, much labour is ſaved.

As the roots naturally grow a little above the ground, notice thoſe which do not ſo appear, and bare them by removing the earth from around their top, as before obſerved in § III. Sow the remains of the ſeed at random, that you may tranſplant the roots where you pleaſe. If you chuſe to leave theſe in the ſame place, they muſt be thinned and dug round early: but this is very troubleſome, and the roots planted thus, never grow ſo large as thoſe whoſe ſeed has been ſet. Experience has proved this difference.

Thoſe perſons who wiſh to have further information concerning the culture of the Scarcity-Plant, may apply to the Abbé de Commerell, in the Abbaye de S. Victor, at Paris. At the requeſt of many people, he has cauſed knives, as deſcribed in his treatiſe, to be made under his own inſpection, which are ſold by M. De la Planche, Apothecary, rue du Roule à Paris, who is the only vender of the ſeed of the Scarcity-Root.

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